



# Operating Instructions



## Zone 1 Ex i Field Device Coupler 8 Spurs

> 9411/21



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## 2 General Information

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### 2.1 Manufacturer

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### 2.2 Operating Instructions Information

ID-No.: 166617 / 941160310040  
 Publication Code: 2014-04-25·BA00·III·en·05  
 We reserve the right to make technical changes without notice.

### 2.3 Definitions of terms

#### Trunk

The trunk is the main bus line when describing fieldbus topology.

#### Terminating resistor (Terminator)

Both ends of the trunk are connected with a terminating resistor (100 ohms + 1 µF).

#### Spur

A spur connects the trunk with the field devices. Spurs can be further subdivided into additional branches.

#### Fieldbus power supply

The fieldbus power supply feeds DC power to field devices on the fieldbus and effects impedance adaptation between the fieldbus and the main power. Electrically, the host behaves the same as a field device.

**Field device**

Field devices are often supplied from the fieldbus, however, they can also have their own power supply (4-wire device).

**Host**

The host is the “brain” of the fieldbus. In general the host is a process control system (PCS), a programmable logic controller (PLC) or a PC.

**Segment**

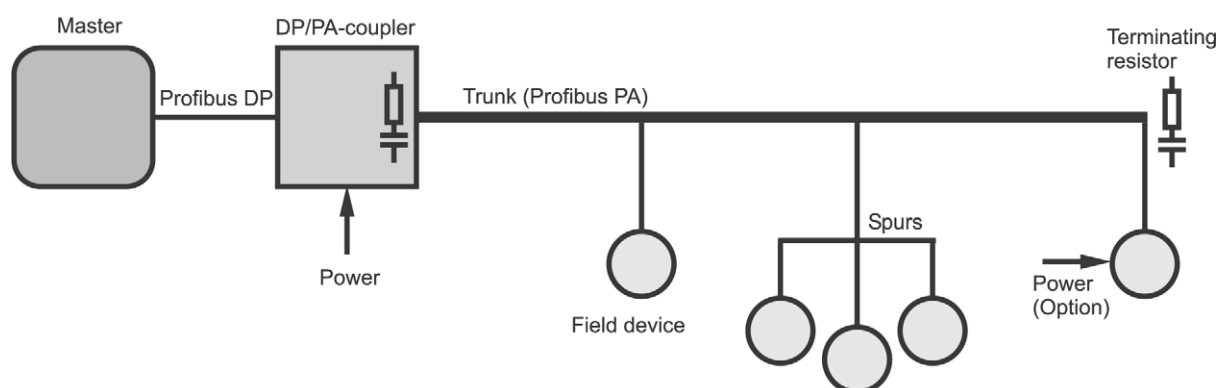
A segment in this context indicates the entire unit consisting of trunk, terminating resistors and all spurs.

**DP/PA coupler**

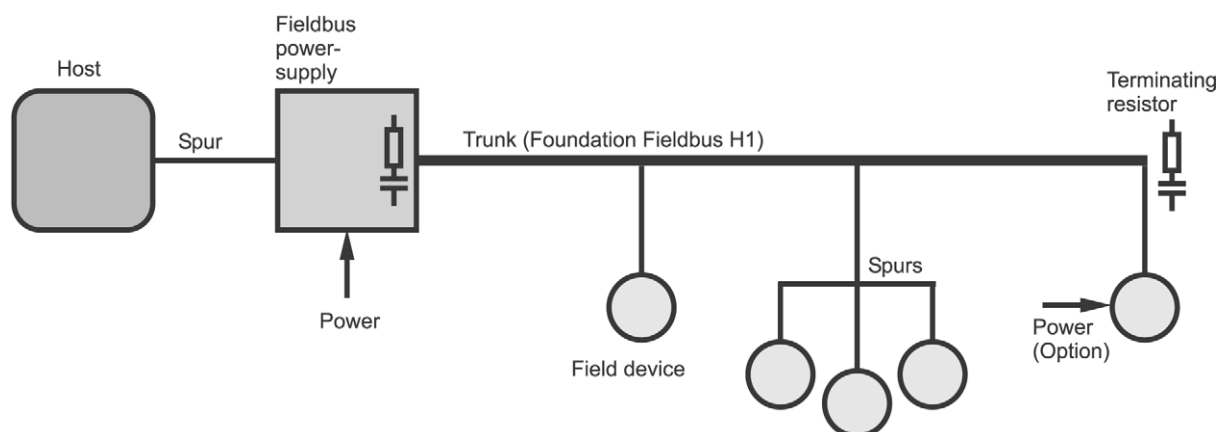
The DP/PA coupler connects a Profibus PA segment with a Profibus DP. The fieldbus power supply is integrated in the DP/PA coupler.

**Master**

The Profibus master is generally a process control system (PCS), a programmable logic controller (PLC) or a PC.

**Structur of a Profibus PA segment**

11462E02


**Structur of a Foundation Fieldbus H1 segment**

11463E02

### 3 General Safety Instructions

#### 3.1 Safety Instructions for Assembly and Operating Personnel

The operating instructions contain basic safety instructions which are to be observed during installation, operation and maintenance. Non-observance will endanger persons, plant and the environment.

 <b>WARNING</b>
<p><b>Danger due to unauthorised work being performed on the device!</b></p> <ul style="list-style-type: none"> <li>▷ There is a risk of injury to persons and damage to equipment.</li> <li>▶ Assembly, installation, commissioning, operation and maintenance must only be performed by personnel who are both authorised and suitably trained for this purpose.</li> </ul>

**Before assembly/commissioning:**

- ▶ Read through the operating instructions.
- ▶ Give adequate training to the assembly and operating personnel.
- ▶ Ensure that the contents of the operating instructions are fully understood by the personnel in charge.
- ▶ The national installation and assembly regulations (e.g. IEC/EN 60079-14) apply.

**When operating the devices:**

- ▶ Ensure the operating instructions are made available on location at all times.
- ▶ Observe safety instructions.
- ▶ Observe national safety instructions and accident prevention regulations.
- ▶ Only run the device according to its performance data.
- ▶ Servicing/maintenance or repair work which are not described in the operating instructions must not be performed without prior agreement with the manufacturer.
- ▶ Any damage may render explosion protection of the device null and void.
- ▶ No changes to the device impairing their explosion protection are permitted.
- ▶ Install and use the device only if it is undamaged, dry and clean.

**If you have questions:**

- ▶ Contact the manufacturer.







#### 3.2 Warnings

Warnings are sub-divided in these operating instructions according to the following scheme:

 <b>WARNING</b>
<p><b>Type and source of the danger!</b></p> <ul style="list-style-type: none"> <li>▷ Possible consequences.</li> <li>▶ Measures to avoid danger.</li> </ul>

They are always identified by the signalling word “WARNING” and sometimes also have a symbol which is specific to the danger involved.

### 3.3 Symbols Used

	Action request: Describes actions to be carried out by the user.
	Reaction sign: Describes the results or the reactions to the actions taken.
	Bullet
	Sentinel: Describes the notes and recommendations.
	Warning sign; danger from energised parts!
	Warning sign: Danger due to an explosive atmosphere!

## 4 Technical Data

#### Explosion protection

Coupler  
mounted on DIN rail

Gas explosion  
protection

ATEX

Ex II 2(1)G Ex mb eb ib [ia] IIC T4

IECEX

Ex mb eb ib [ia] IIC T4

Dust explosion  
protection

ATEX

Ex II (1)D [Ex ia] IIIC

IECEX

[Ex ia] IIIC

Coupler  
in the standard enclosure

Gas explosion  
protection

ATEX

Ex II 2(1)G Ex mb eb ib [ia] IIC T4

IECEX

Ex mb eb ib [ia] IIC T4

Dust explosion  
protection

ATEX

Ex II 2(1)D Ex tD A21 IP 6X T80°C [ia D]

IECEX

Ex tD A21 IP 6X T80°C [ia D]

#### Certificates

ATEX

BVS 06 ATEX E 004 X

IECEX

IECEX BVS 08.0057 X

#### Installation

in Zones 1 and 2, Zones 21 and 22 (dust), Class I, Zones 1 and 2, Class I Division 2  
and in the safe area  
suitable enclosure necessary  
e.g. R. STAHL Series 8146 (plastic) or 8125, 8150 (stainless steel)

Safety data (CENELEC) per spur	FISCO (IEC 60079-27)
Max. voltage $U_0$	15.7 V
Max. current $I_0$	245 mA
Max. power $P_0$	960 mW
Max. connectable capacitance $C_0$ for IIC/IIB	476 nF / 2878 nF
Max. connectable inductance $L_0$ for IIC/IIB	0.58 mH / 2.9 mH
Max. internal capacitance $C_i$	1.1 nF
Max. internal inductance $L_i$	~ 0 mH
Insulation voltage $U_m$	253 V
Power supply	not required, the Field Device Coupler is powered from the trunk
Galvanic isolation	Test voltage according to EN 50020
Ex i spurs to Ex e trunk	1.5 kV AC
Ex i spur to Ex i spur	No galvanic isolation
Data transmission	
between trunk and spurs	passive, no repeater function
Trunk, non-intrinsically safe / Ex e	
Connections	2 trunk connections (in, out), internally bridged
Voltage range	16 ... 32 V
Undervoltage monitoring	$U < 16$ V, spurs de-energised
Max. current DC	
Max. power dissipation	1.8 W
Indication	Green LED "PWR" ( $U \geq 16$ V from trunk)
Reverse polarity protection	yes
Max. number of Field Device Couplers	4 per trunk
Terminating resistor	The field device couplers have a built-in, switchable terminating resistor $100 \Omega + 1 \mu F$ (IEC 61158-2). A jumper between the terminals TERM 1 and 2 connects the terminating resistance to the trunk. As an alternative, it is also possible to use an external terminating resistor series 9418.
Spurs, intrinsically safe FISCO Ex i	
Quantity	8
Number of field devices	1 per spur
Max. cable length	120 m
Output voltage	$\geq 10$ V at 40 mA per spur
Current range	0 ... 41 mA per spur, max. 160 mA for 8 spurs
	Detailed planning should be made using the Fieldbus Wizard ( <a href="http://www.fieldbus-solutions.info">www.fieldbus-solutions.info</a> ).
Min. no-load voltage	12 V
Max. internal resistance	65 $\Omega$
Max. short-circuit current	50 mA
Indication per spur	Yellow LED "S1" ... "S8"

Earthing of cable shields  
(trunk and spurs)

Direct earthing

on grounding bar

Capacitive earthing

 via 4.7 nF at terminal „S“;  
(grounding bolt M6)

## Power management

If the trunk voltage exceeds 16 V, the spurs are switched on one after the other to prevent a high start-up current due to the field devices. A short circuit detected on a spur will deactivate the respective spur until the short-circuit is removed. Regardless of how many spurs are short-circuited, the trunk is loaded with max one short-circuit current. This minimises the current consumption of the trunk and the power dissipation under all operating conditions.

## Fault detection

Spur short-circuit

 $\geq 42 \dots 50 \text{ mA}$ 

 Indication of short-circuit  
per spur

Yellow LED "S1" ... "S8", flashing

Collective error message

Red LED "ERR" flashes

 Error indication on field  
device coupler

Red LED "ERR"

 Indication of spur causing  
overload

LED yellow "S1" ... "S8" blinking quickly

## Electromagnetic compatibility

Tested to the following standards and regulations: EN 61326 (IEC/EN 61000-4-1...6 and 11; EN 55022 class B); NAMUR NE 21 (IEC/EN 61000-4-1...6, 8 and 11; EN 55022 class B)

## Ambient conditions

Ambient temperature

Coupler mounted on DIN rails: - 40 ... + 75 °C

Coupler built in a standard enclosure: - 20 ... + 70 °C

Storage temperature

- 40 ... + 75 °C

 Relative humidity  
(no condensation)

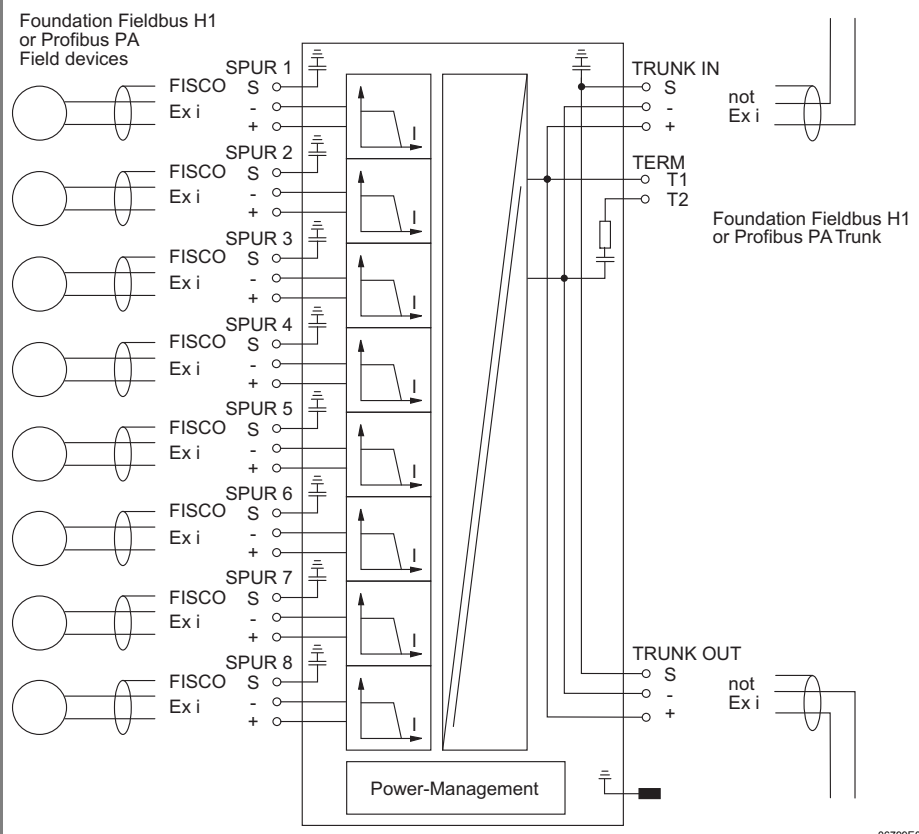
&lt; 95 %

## MTBF

(according to SN 29500)

109 years (at 40 °C)

## Connection diagram



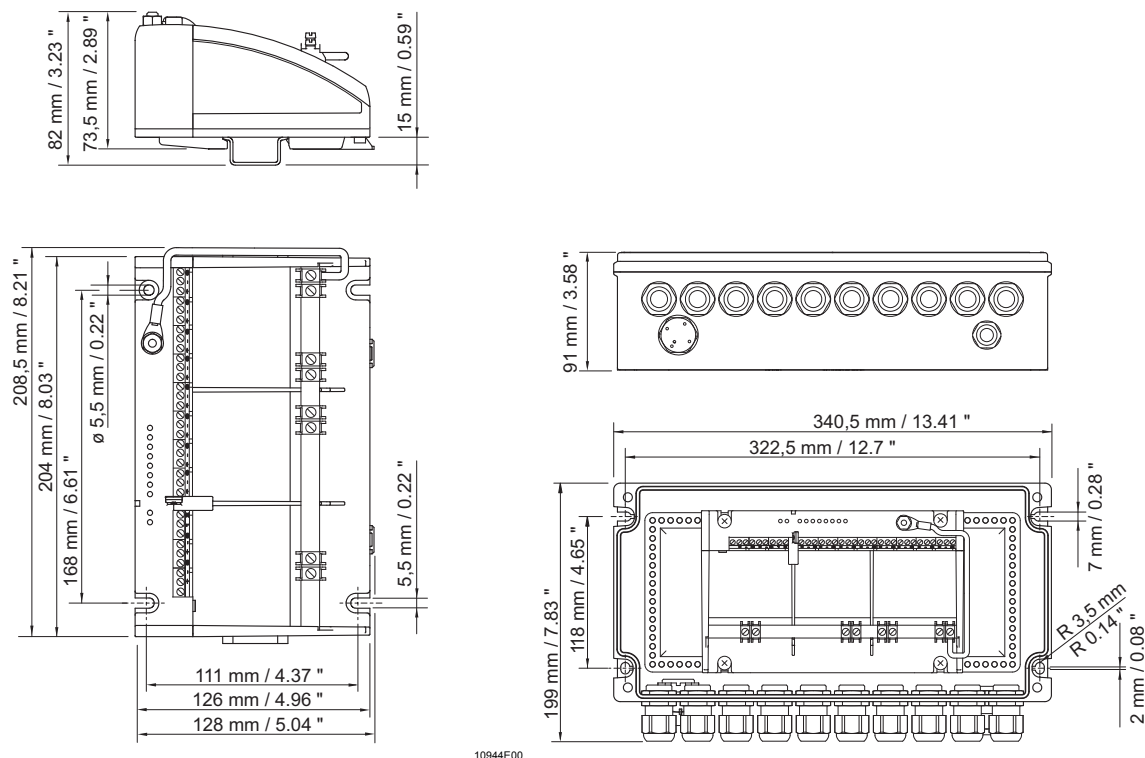
Mechanical data					
Terminals	3 pole (+, -, screen)	screw terminals	spring cage terminals		detachable screw terminals
		trunk Ex e spurs Ex i	trunk Ex e	spurs Ex i	only for spurs Ex i (trunk Ex e see "screw terminals")
	rigid	0.2 ... 4 mm <sup>2</sup>	0.5 ... 2.5 mm <sup>2</sup>	0.08 ... 2.5 mm <sup>2</sup>	0.2 ... 4 mm <sup>2</sup>
	flexible	0.25 ... 2.5 mm <sup>2</sup>	0.5 ... 2.5 mm <sup>2</sup>	0.08 ... 2.5 mm <sup>2</sup>	0.25 ... 2.5 mm <sup>2</sup>
	flexible, end covering sleeves	0.25 ... 2.5 mm <sup>2</sup>	0.5 ... 1.5 mm <sup>2</sup>	0.08 ... 1.5 mm <sup>2</sup>	0.25 ... 2.5 mm <sup>2</sup>
Assembly	on DIN rail, EN 50022 (NS 35/15, NS 35/7.5) or mounting plate				
Installation position	vertical or horizontal				
Degree of protection					
Enclosure	IP30				
Ex i terminals	IP20				
Ex e terminals	IP 30, cover closed (enclosure may be opened in hazardous area while connected to power)				
Fire protection class (UL-94)	HB				
Field Device Coupler in a standard enclosure					
Version	material	enclosure Series	Field Device Coupler		
	polyester	8146/.S71	9411/21-211-41 9411/21-221-41 9411-21-231-41		
	stainless steel	8125/.071	9411/21-212-41 9411/21-222-41 9411/21-232-41		
Degree of protection	IP66				
Cable glands	cable glands Series 8161		8 x M20 blue (Ex i spurs) 2 x M20 black (Ex e trunk) 1 x M16 black (earth)		
	breathing gland Series 8162		1 x M25		



Additional technical data for layout and designs: see the data sheet

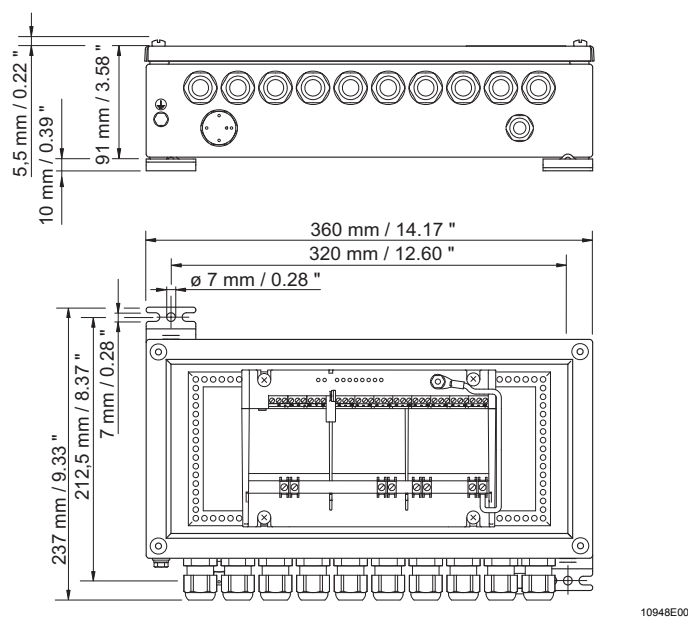


**Dimensional Drawings** (All Dimensions in mm / inches) - Subject to Alterations



**9411/21-2.0-41**  
Field Device Coupler without enclosure

**9411/21-2.1-41**  
Enclosure 8146/.S71 incl. Field Device Coupler



**9411/21-2.2-41**  
Enclosure 8125/.071 incl. Field Device Coupler

## 5 Designated Use

### WARNING

#### Use the device for its intended purpose only!

- ▷ Otherwise, the manufacturer's liability and warranty expire.
- ▶ Only use the device under the operating conditions described in the operating instructions.
- ▶ The device must be used in areas subject to explosion hazards only according to these operating instructions.

The series 9411/21 field device coupler is suitable for use in Zone 1, 2, 21 and 22 hazardous areas.

It is used for connecting up to eight intrinsically safe field devices to a non-intrinsically safe trunk. In so doing, the trunk and spurs are galvanically isolated.

#### Intended use

- ✗ For all fieldbuses with a IEC 61158-2 physical layer, e.g. Foundation Fieldbus H1 and Profibus PA.
- ✗ For non-intrinsically safe trunks, Ex e connections.
- ✗ For intrinsically safe spurs (Ex i and FISCO), to connect intrinsically safe field devices.

#### Overview of explosion protection for field device coupler, trunk and spurs

Field device coupler EX e / Ex i	Zone 0	Zone 1	Zone 2	Zone 21	Zone 22	non-hazardous area
9411/21-211-41, 9411/21-221-41, 9411/21-231-41 without enclosure	not permitted	Ex e enclosure required	Enclosure as per IEC/EN 60079-15 required	Enclosure as per IEC/EN 61241-1 required	Enclosure as per IEC/EN 61241-1 required	o.k.
9411/21-211-41, 9411/21-221-41, 9411/21-231-41 with polyester enclosure 8146/..71	not permitted	o.k.	o.k.	o.k.	o.k.	o.k.
9411/21-212-41, 9411/21-222-41, 9411/21-232-41 with stainless steel enclosure 8125/..71						
Trunk	not permitted	Ex i	Ex nA	o.k.	o.k.	o.k.
Spurs	Ex ia	Ex ia	Ex nL	o.k.	o.k.	o.k.



The R. STAHL enclosure series 8146 (polyester), 8125 (sheet steel or stainless steel), 8126 (stainless steel) meet the requirements.

### WARNING

#### When mounting in an Ex e enclosure:

- ▶ Affix an indication label (in accordance with IEC/EN 60079-7):  
"Non-intrinsically safe circuits protected by internal IP30 cover"

## 6 Functional Description

The field device coupler is used for connecting up to eight intrinsically safe field devices to a non-intrinsically safe trunk. In so doing, the trunk and spurs are galvanically isolated.

The field device coupler functions at the physical level only, e.g., it functions independently of the protocol used. It can therefore be used for every fieldbus that is compliant with IEC 61158-2. At this time, these include the Foundation Fieldbus H1 and the Profibus PA.

Each field device can be supplied with a maximum of 40 mA current. As short circuit protection, each spur features a 50 mA current limiting function.

In total max. 160 mA are available for rated operation. This current can be divided as required between the field devices connected e.g.:

- ✗ 8 x 20 mA
- ✗ 1 x 40 mA, 7 x 16 mA
- ✗ 1 x 30 mA, 7 x 18 mA
- ✗ 6 x 23 mA
- ✗ 5 x 28 mA
- ✗ 4 x 15 mA, 4 x 25 mA („Short circuit check“ deactivated).

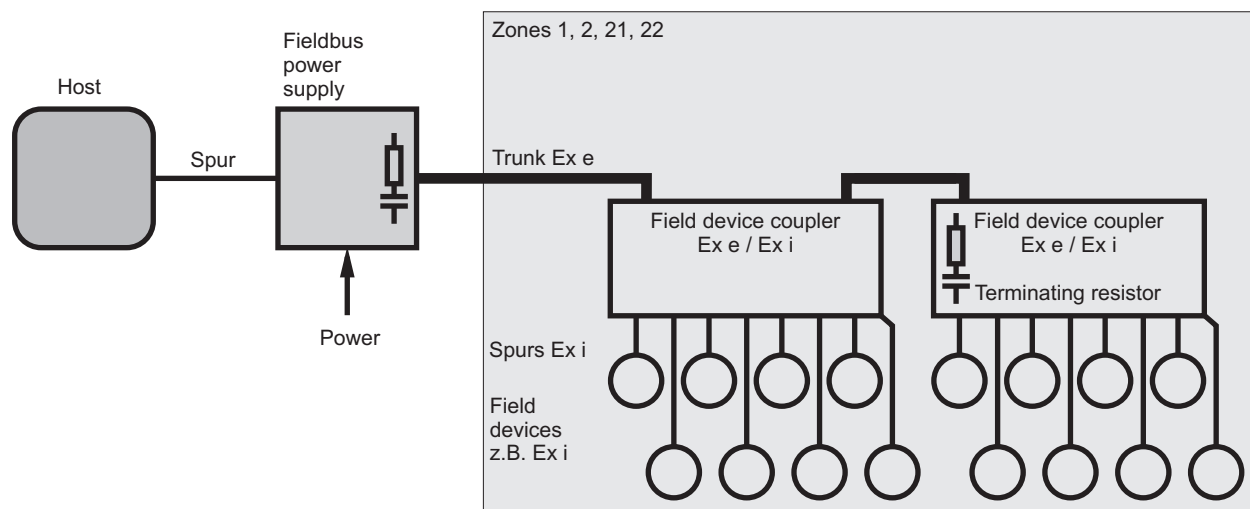
In addition, a tester can be connected to a spur, up to a total current of 40 mA.

A prerequisite for this action is that the "Short circuit check" option is selected in the "Fieldbus Wizard" calculation tool during the verification of the segment. As a result, any number of short circuits on a field device coupler are allowed at normal load. Short circuits are allowed on a field device coupler's spurs within the segment.

A termination resistor is built-in and can be activated/deactivated via a jumper.

Cable shield can either be capacitively or directly earthed. Trunk and spurs can be earthed differently.

The trunk voltage connecting to the field device coupler is monitored for undervoltage (< 16 V) and indicated by a LED. Other LEDs indicate the status of the spurs (see chapter 11).



06579E02

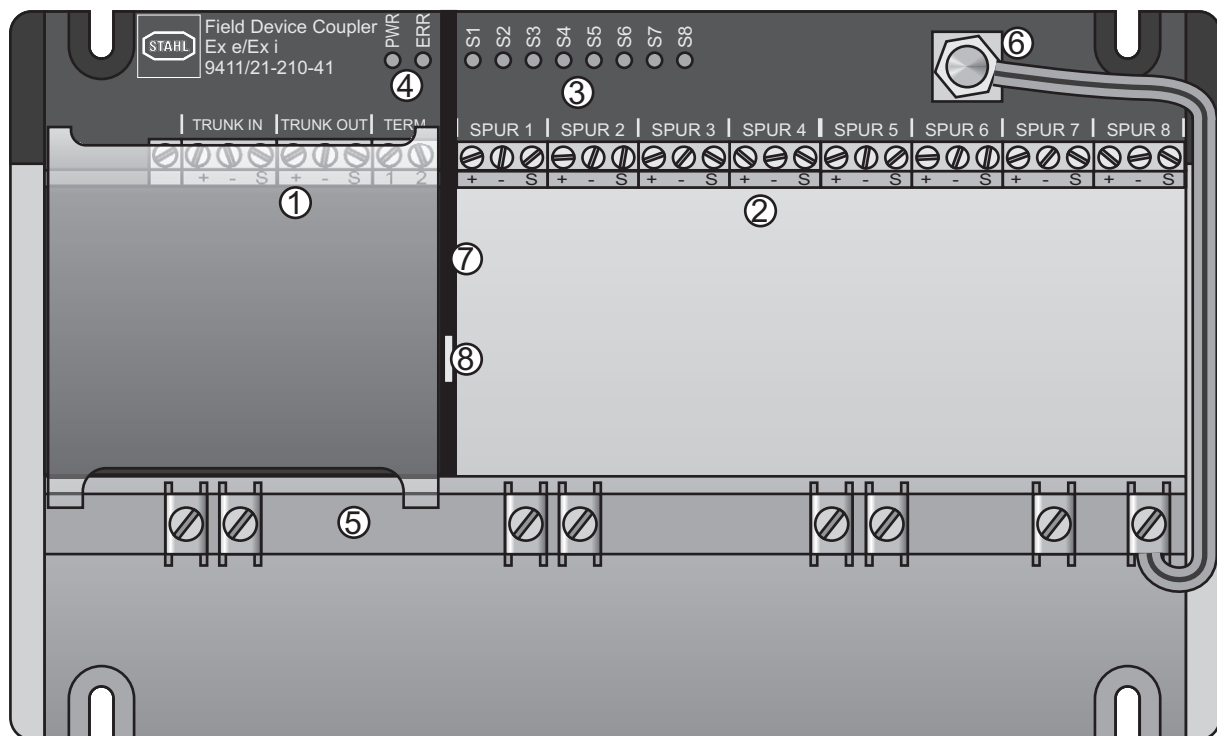
### **Power management**

As soon as the voltage of 16 V on the trunk is exceeded , the spurs are activated one after the other to prevent a high start-up current by the field devices.

Every field device has available, for a reliable start, the full current of at least 40 mA. Should the permissible total load for the field device coupler be exceeded due to an incorrect configuration (overload), the spur on which a load increase has been detected will be shut down. If a load increase has not been detected, the spur with the highest number will be shut down.

In the event of a short-circuit, the spur in question is deactivated until the short-circuit is eliminated. If several spurs are affected by a short-circuit, the trunk is loaded only with maximum one short-circuit current. This minimises the current consumption of the trunk and the power loss of the coupler under all operating conditions.

## 7 Device design



11455E00

- |   |                                                                                                                                                            |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Ex e area;<br>The Ex e connection terminals for the trunk and the jumper for activating the terminating resistor are protected by a hinged cover (IP 30).. |
| 2 | Ex i area;<br>Ex i connection terminals for spur 1 ... spur 8                                                                                              |
| 3 | Operation indicating LEDs for spur 1 ... spur 8                                                                                                            |
| 4 | Operation indicating LEDs for PWR (power) and ERR (error)                                                                                                  |
| 5 | Cable screen bus bar for cable shields with slidable terminals                                                                                             |
| 6 | Ground bolt for earthing                                                                                                                                   |
| 7 | Partition plate; guarantees prescribed spacing of lead wires between Ex e and Ex i connection terminals                                                    |
| 8 | Park position for jumper                                                                                                                                   |

## 8 Transport, Storage and Disposal

### Transport

- Shock-free in its original carton, do not drop, handle carefully.



### Storage

- Store in a dry place in its original packaging
- Permitted temperature range for storage in original packaging: - 40 °C ... + 75 °C


### Disposal

- Ensure environmentally friendly disposal of all components according to the legal regulations.

## 9 Assembly



⚠ WARNING	
	<b>Incorrectly installed components!</b>
	<ul style="list-style-type: none"> <li>► Explosion protection cannot be guaranteed any more if the components are incorrectly installed.</li> <li>► Carry out the assembly in strict accordance with the instructions and national safety and accident prevention regulations (e.g. IEC/EN 60079-14).</li> </ul>
	Do not select a mounting location that necessitates the cable lengths that exceed the maximal permissible values (see chapter 10.3, Cable lengths).

### 9.1 Mounting with enclosure

	Relevant to field device couplers 9411/21-211-41, 9411/21-221-41 respectively 9411/21-231-41 in polyester enclosure 8146/..71 and 9411/21-212-41, 9411/21-222-41 respectively 9411/21-232-41 in stainless steel enclosure 8125/..71
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- Installation with screws (hole spacing: see chapter 4, Technical data)

### 9.2 Mounting without enclosure

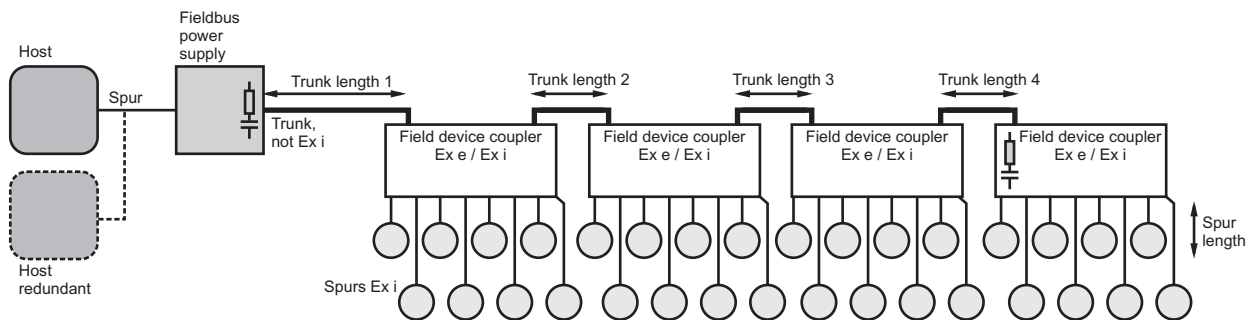
	Relevant to field device couplers 9411/21-210-41, 9411/21-220-41 respectively 9411/21-230-41
	Field device couplers without enclosures are always delivered ready for DIN rail mounting.

- ✗ For installation in non-hazardous areas, e.g.g in normal switch cabinet or open rack.
- ✗ For installation in an enclosure not mentioned above.

## 10 Installation

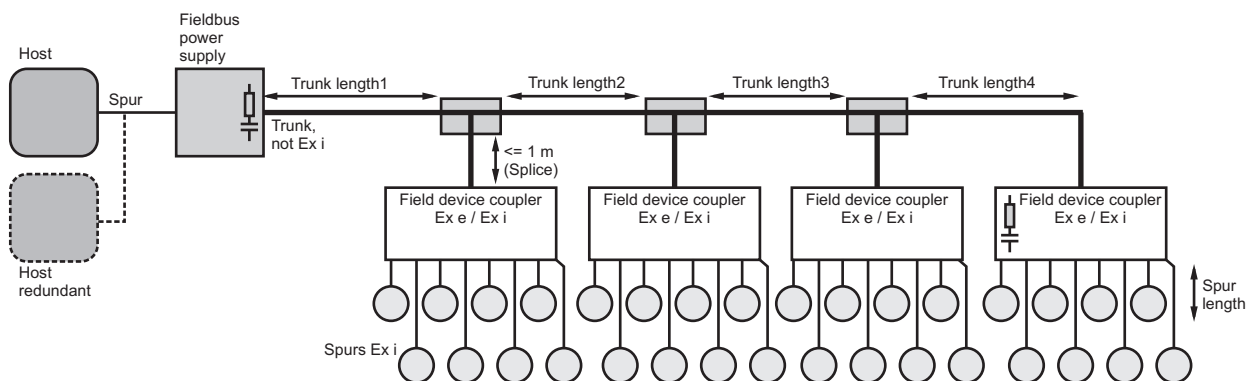
<b>⚠ WARNING</b>	
	<p><b>Incorrectly installed components!</b></p> <ul style="list-style-type: none"> <li>▶ Explosion protection cannot be guaranteed any more if the components are installed incorrectly.</li> <li>▶ Carry out the installation in strict accordance with the instructions and national safety and accident prevention regulations (e.g. IEC/EN 60079-14).</li> </ul>

### 10.1 Examples of fieldbus segment topologies



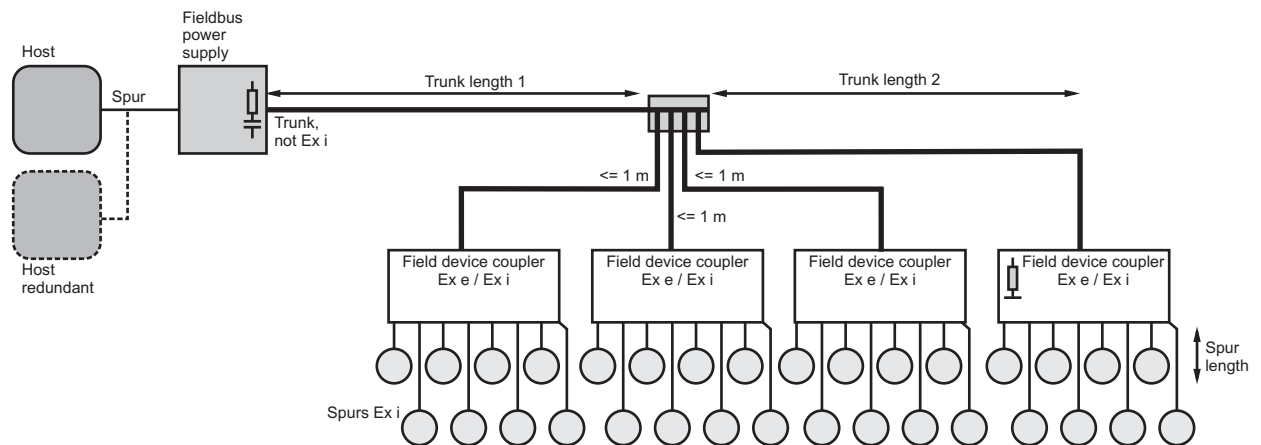
06586E02

Fieldbus segment with „daisy chain structure“. The trunk is looped through the field device couplers.



06587E02

Fieldbus segment in which the field device couplers are connected to the trunk with junction boxes (T-connectors).



06588E02

Fieldbus segment with star structure.

## 10.2 Proof of intrinsic safety

### Proof of intrinsic safety in accordance with FISCO

A spur is intrinsically safe if:

- ✗ the field device is certified in accordance with FISCO.
- ✗ the conditions regarding cable values as per IEC 60079-27 are adhered to:
  - $R_C$  15 ... 150 Ohm/km
  - $L_C$  0.4 ... 1mH/km
  - $C_C$  45 ... 200nF/km

### Proof of intrinsic safety in accordance with the „entity concept“



A spur is intrinsically safe if the safe maximum values for the field device and spur connections are met:

Spur of field device coupler		Field device
$U_0$	$\leq$	$U_i$
$I_0$	$\leq$	$I_i$
$P_0$	$\leq$	$P_i$
$C_0$	$\geq$	$C_i + C_{Cable}$
$L_0$	$\geq$	$L_i + L_{Cable}$




Whereby,  $C_{Cable}$  and  $L_{Cable}$  are the results of the total capacity, respectively, inductivity of the spur cable, which, in turn, depends on the cable length.



### 10.3 Cable lengths for trunk and spurs in accordance with IEC 61158-2, Annex B (without considering the explosion protection)

	For planning we recommend the usage of our free planning tool "Fieldbus Wizard". It can be downloaded on the Internet from <a href="http://www.fieldbus-solutions.info">www.fieldbus-solutions.info</a> .
	The maximum length for all cables (all trunks, all spurs) per segment must not exceed 1900 m.

	Number of all field devices on the segment, including host(s)				
	1 ... 12	13 ... 14	15 ... 18	19 ... 24	25 ... 30
Max. cable length for spurs, 1 field device per spur	120 m	90 m	60 m	30 m	1 m
Max. cable length for spurs, 2 field devices per spur (e.g. for redundant hosts)	90 m	60 m	30 m	1 m	1 m

	The actual trunk and spur lengths can be shorter due to voltage drop.
	The maximum length of an Ex i spur according to IEC 60079-27 (FISCO) is 60 m. From the viewpoint of the FISCO model, the Ex i spurs of a field device coupler are to be considered as a new segment (whereby the maximum segment length = trunk + spurs = 1000 m). The table above can be used for this purpose.
	The following generally applies: Spurs should be kept as short as possible. Maximum spur length = 120 m

### 10.4 Examples of cable lengths

#### Cable lengths for trunk with 12 field devices with a current consumption of 15 mA:

Assumption:


- ✗ Fieldbus power supply with  $U_{out} > 25 \text{ V}$  /  $I_{out} > 350 \text{ mA}$ .
- ✗ Current consumption of host is 20 mA.
- ✗ Type A fieldbus cables (loop resistance: 44 ohms/1000 m) are used.
- ✗ Two field device couplers lie at the end of the trunk.
- ▷ Maximum trunk length: approx. 600 m.

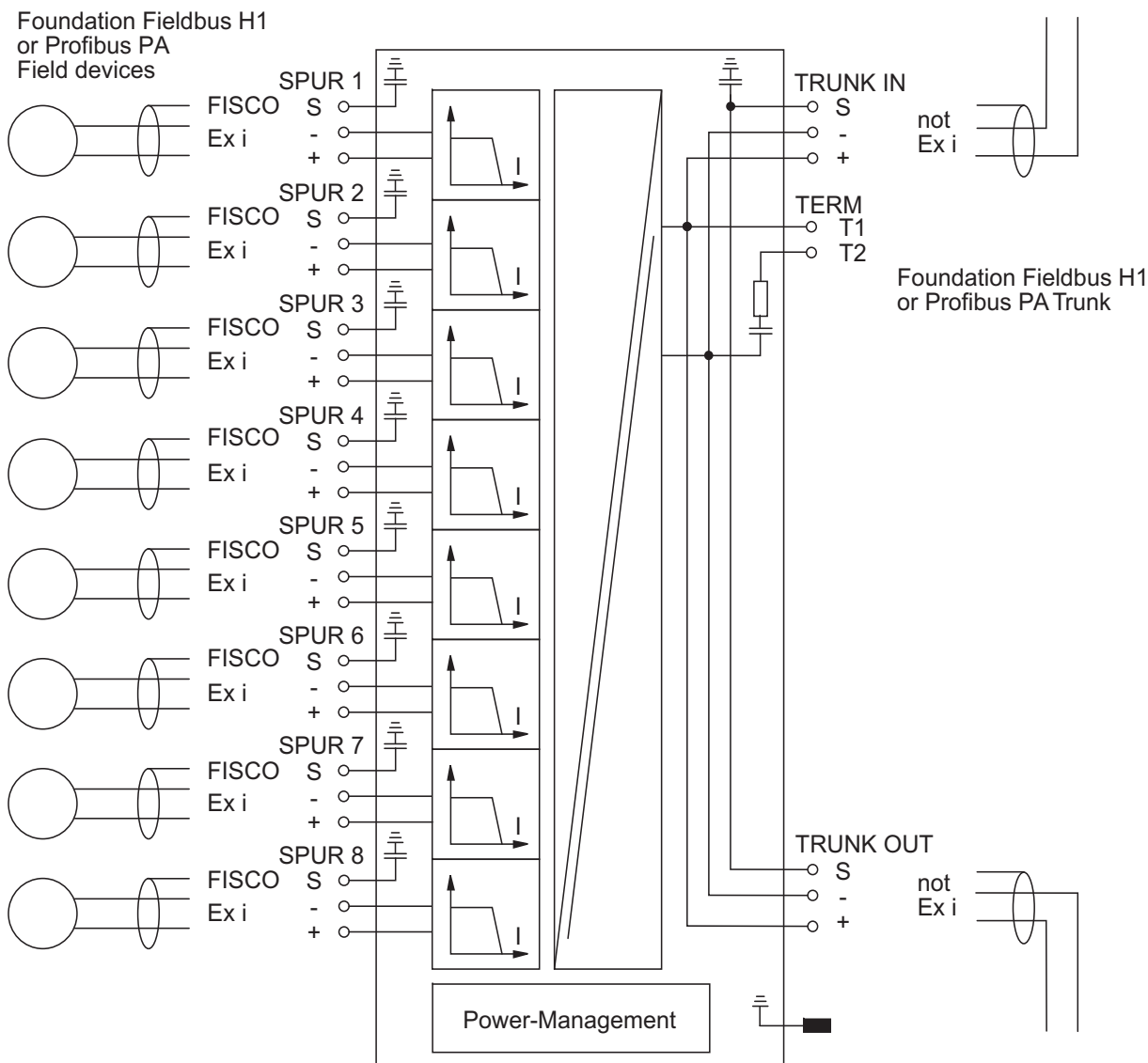
#### Cable length for trunk with 16 field devices with a current consumption of 15 mA per device:

Assumption:

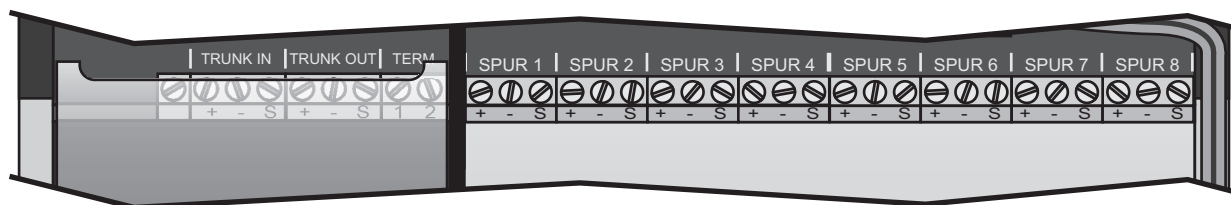
- ✗ Fieldbus power supply with  $U_{out} > 25 \text{ V}$  /  $I_{out} > 350 \text{ mA}$ .
- ✗ Current consumption of host is 20 mA.
- ✗ Type A fieldbus cables (loop resistance: 44 ohms/1000 m) are used.
- ✗ Two field device couplers lie at the end of the trunk.
- ▷ Maximum trunk length: approx. 450 m

## 10.5 Connection

⚠ WARNING	
	<p><b>Laying of intrinsically safe and non-intrinsically safe cabling together:</b></p> <ul style="list-style-type: none"> <li>▶ Explosion protection is not guaranteed any longer.</li> <li>▶ Always lay intrinsically safe and non-intrinsically safe cables in separate paths.</li> </ul>






06799E02





06578E00

## Connecting Trunk

 <b>WARNING</b>	
	<b>Open cover on the non-intrinsically safe trunk:</b> <ul style="list-style-type: none"> <li>▶ Explosion protection is not guaranteed any longer.</li> <li>▶ The fieldbus must be deactivated before opening the cover.</li> <li>▶ Secure the fieldbus against unauthorised activation.</li> </ul>
	<b>TRUNK IN and TRUNK OUT (+,-,S) are connected through internally in the field device coupler.</b>

- ▶ Disconnect the fieldbus from the power supply.
- ▶ Open enclosure/cover.
- ▶ Insert leads in the corresponding terminals:  
 TRUNK IN: Lead from host or fieldbus power supply.  
 TRUNK OUT: If applicable, lead to the next field device coupler.
- ▶ Close/screw tight the terminals.
- ▶ Close cover/enclosure.


## Connecting Spur

	Intrinsically safe spur connections can be worked on while connected to power.
	Only one field device can be connected per spur connection.

- ▶ Open enclosure.
- ▶ Insert leads in the corresponding terminals.
- ▶ Close/screw tight the terminals.
- ▶ Close enclosure.

## 10.6 Earthing

### Field device coupler without enclosure

	The field device coupler is not required to be connected to earth because the intrinsically safe and non-intrinsically safe circuits are galvanically isolated from each other.
-------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

If the cable shields are to be capacitively earthed (by connecting to the "S" marked terminals):

- ▶ Connect the earthing bolt to the cable screen bus bar (delivery condition from factory).
- ▶ Connect the cable screen bus bar to earth.

### Field device coupler with metal enclosure


- ▶ Connect the enclosure to earth via the shortest possible route.

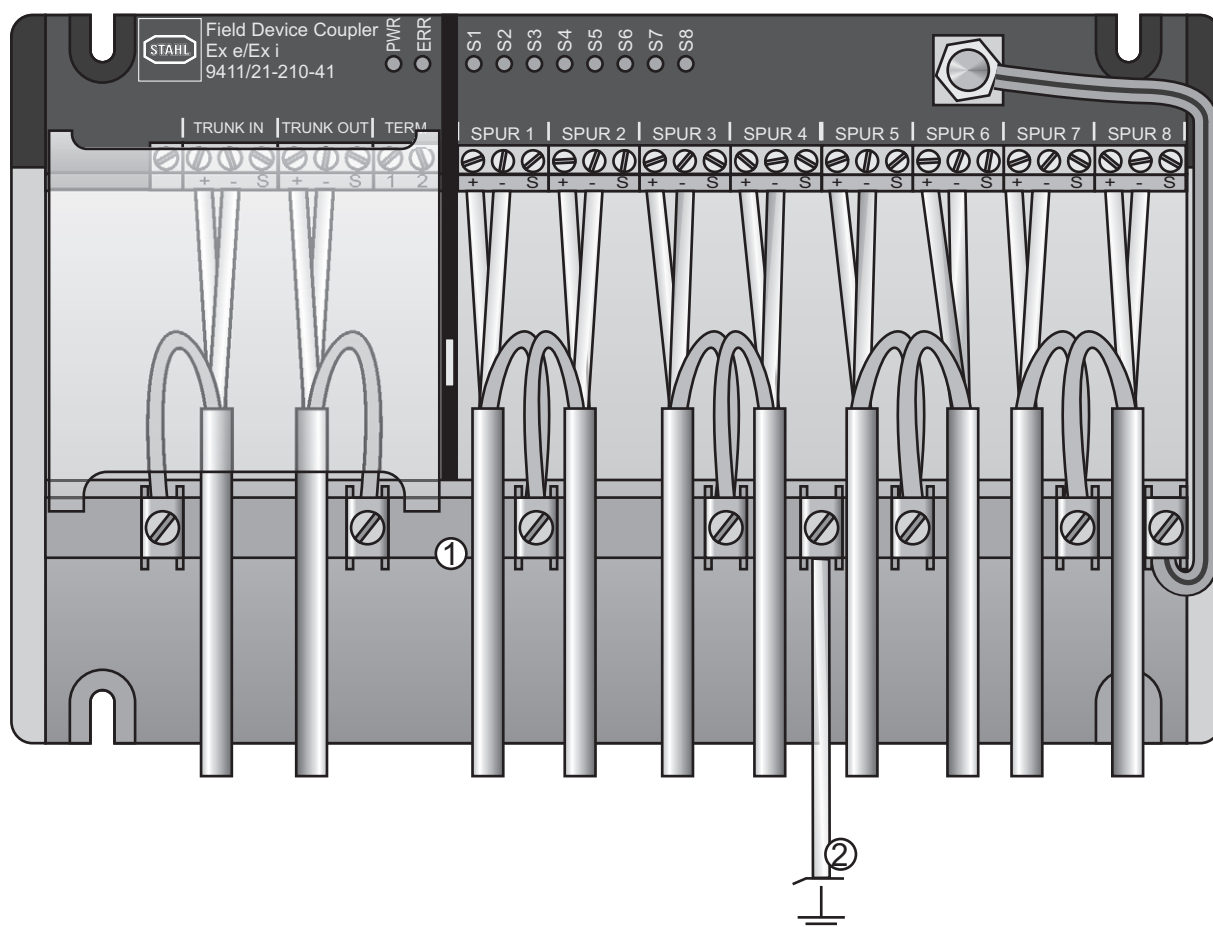
## 10.7 Earthing of cable shields

There are many regulations regarding earthing of cable shielding:

- ✗ IEC / EN 60079-14, section 12.2.2.3
- ✗ Profibus Technical Guideline „Profibus PA“ User and Installation Guideline, section 3.3.3
- ✗ Fieldbus Foundation „System Engineering Guidelines“ AG 181, section 6.2f


### Multiple Point Grounding:

 The direct earthing the cable shielding at both cable ends is the best solution in view of electromagnetic compatibility. The prerequisite for this is high-quality potential equalisation.



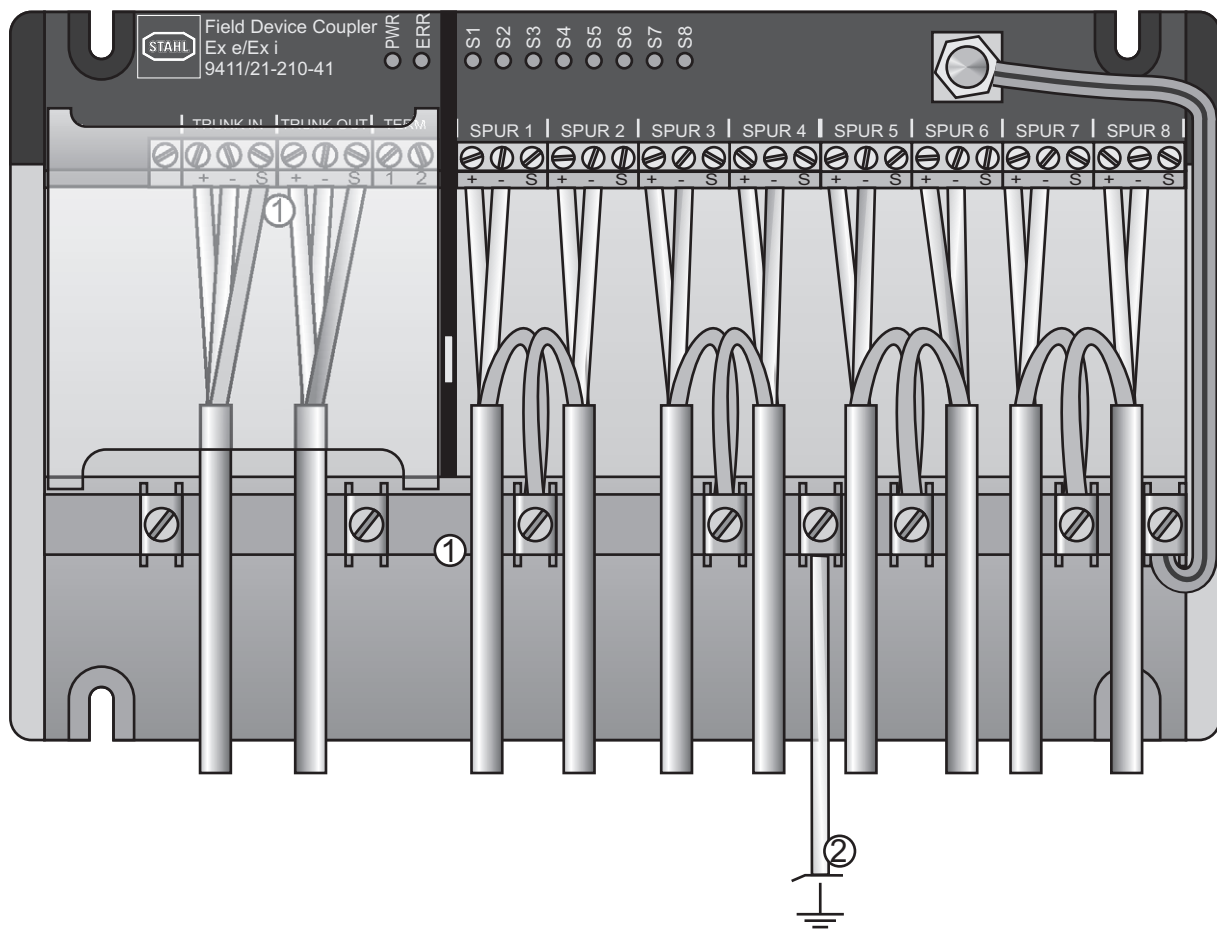
06581E00

- Lay all cable shields of the trunk and spurs on the cable screen bus bar (1).
- Connect the cable screen bus bar to earth via the shortest possible route (2).

 When installing directly (with screws) in metal enclosure 8125, the earthing bolt is electrically connected via mounting to the enclosure.

- Directly earth the cable shield of the trunk at the host/fieldbus power supply side (as a rule, at the fieldbus power supply).
- Directly earth the cable shields of the spurs at the field devices.

## Single Point Grounding:



06583E00


- ▶ Connect the cable shields of the trunk to the “TRUNK IN S” terminals and, if needed, to the “TRUNK OUT S” (1).
- ▶ Connect the earthing bolt (2) with the cable screen bus bar so that good conductance is achieved (delivery condition from factory).
- ▶ Connect the cable screen bus bar to earth via the shortest possible route (3).
- ▷ In this way, the cable shield of the trunk is capacitively earthed.



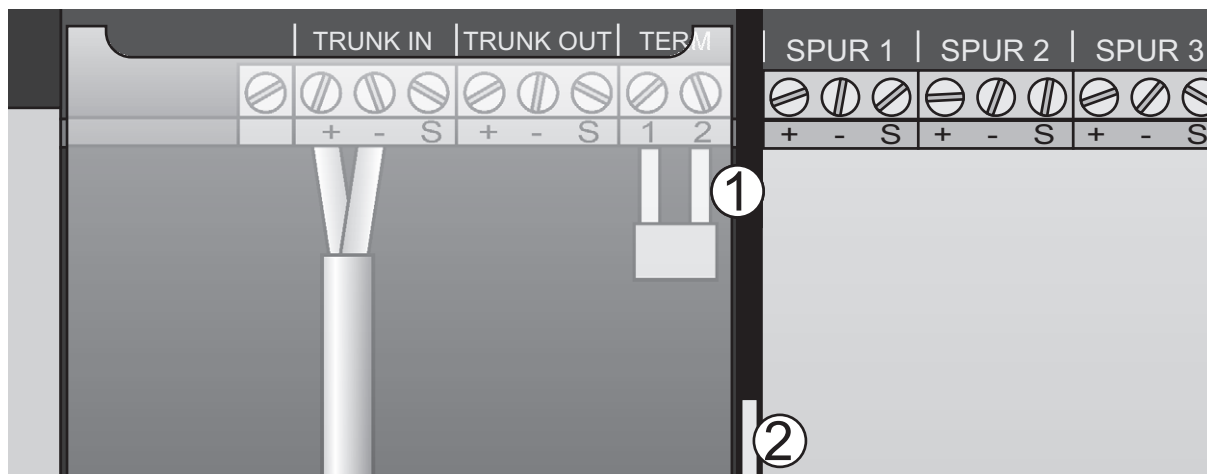
When installing directly (with screws) in metal enclosure 8125, the earthing bolt is electrically connected via mounting to the enclosure.

- ▶ Lay the cable shields of the spurs on the cable screen bus bar.
- ▶ Directly earth the cable shield of the trunk at the host/fieldbus power supply side (as a rule, at the fieldbus power supply).
- ▶ Insulate the cable shields of the spurs connecting at the field devices. Do not earth them.


## 10.8 Terminating resistor (terminator)

	A terminating resistor is required at both ends of the trunk. Spurs are operated without terminating resistors.
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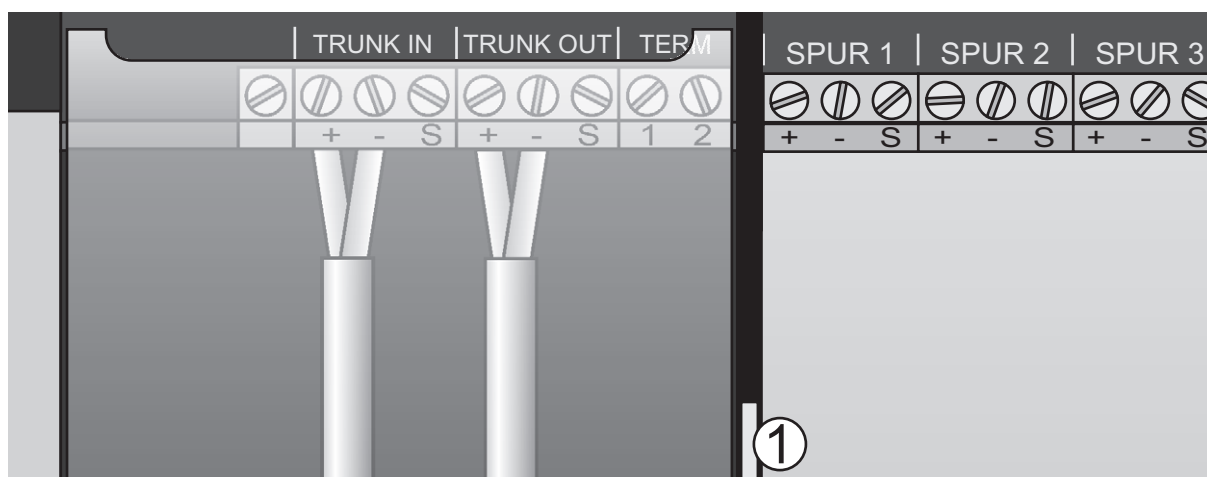
**Field device coupler is located at the end of the trunk**




06584E00

	The terminals on the „TRUNK OUT“ terminal block are not to be used.
▶	Remove the factory-provided jumper from the park position (2).
▶	Insert the jumper in terminals „1“ and „2“ on the „TERM“ terminal block (1).
▶	Close/screw tight the terminals.
▷	The built-in terminating resistor is activated.

**Field device coupler is not located at the end of the trunk**



06585E00

	The terminals on the „TERM“ terminal block are not to be used.
▶	Insert the factory-provided jumper in the park position (1).
▷	The built-in terminating resistor is not activated.

## 11 Putting into Service

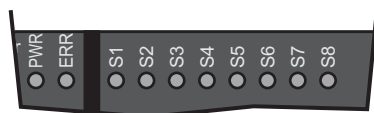
### Before commissioning

- ▶ Test the components for correct operation and installation in accordance with the operating instructions and other applicable specifications.
- ▶ Check that cables and lines are clamped properly.
- ▶ Inspect housing for damage.
- ▶ Inspect housing for foreign bodies.
- ▶ Check whether all unused cableglands and holes are sealed off properly.

### Commissioning

- ▶ Observe the national regulations when commissioning.
- ▶ Follow the Directives in accordance with EN 60079-17 when conducting function inspections.
- ▶ The voltage on the trunk must be at least 16 V DC.
- ▶ The voltage to the connected field devices must be at least 9 V DC.



### LED indicators, functional description



11451E00

PWR, green	ERR, red	S (1 ... 8), yellow	Description
OFF			No voltage on the trunk
ON			Voltage on trunk o.k. $U \geq 16 \text{ V}$
	OFF	OFF	Open-circuit on the corresponding spur Spur not connected $I \leq 1 \text{ mA}$
	OFF	ON	Corresponding spur connected to field device, $3 \text{ mA} \leq I \leq 40 \mu\text{A}$
	blinking	blinking	Short-circuit on the corresponding spur $40 \text{ mA} \leq I \leq 50 \mu\text{A}$
	ON		Internal device fault
	ON	blinking fast	Related spur is causing an overload (total current > 160 mA during rated operation)

## 12 Maintenance

⚠ WARNING	
	<b>Danger from energised parts!</b> <ul style="list-style-type: none"> <li>▷ Explosion protection is not guaranteed any longer.</li> <li>▷ Switch off the power to the fieldbus before opening the enclosure cover.</li> <li>▷ Secure the fieldbus against unauthorised activation.</li> </ul>
	 <p>The enclosure may be opened while connected to power. Intrinsically safe spurs can be worked on while connected to power.</p>


### 12.1 Regular Maintenance Work

- ▶ Consult the relevant national regulations (e.g. IEC/EN 60079-17) to determine the type and extent of inspections.
- ▶ Plan the intervals so that any defects in the equipment which may be anticipated are promptly detected.

#### To check as part of the maintenance schedule:

- ✗ Check that cables and lines are clamped properly.
- ✗ Tightness of the cable glands.
- ✗ Inspect the enclosure for visual damage.
- ✗ Check the seal between enclosure and cover.
- ✗ Check the enclosure for moisture
- ✗ Check the compliance with the permitted temperatures.
- ✗ Make sure that the device is used according to its designated use.

### 12.2 Repair work

⚠ WARNING	
	<b>Danger due to improper maintenance/repairs</b> <ul style="list-style-type: none"> <li>▷ Explosion protection is not guaranteed any longer.</li> <li>▷ Repair work to the device must only be performed by R. STAHL.</li> </ul>

### 12.3 Cleaning

- ✗ Clean with a cloth, brush, vacuum cleaner or similar items.
- ✗ When cleaning with a damp cloth use water or mild, non-abrasive, non-scratching cleaning agents.
- ✗ Never use aggressive cleaning agents or solvents.



# 13 EC-Declaration Of Conformity

## EG-Konformitätserklärung EC-Declaration of Conformity Déclaration de Conformité CE



Wir, we; nous

R. STAHL Schaltgeräte GmbH, Am Bahnhof 30, 74638 Waldenburg, Germany

9411/21-2de-f1

9411/24-3de-f1

d = 1, 2 e = 0, 1, 2 f = 3, 4

erklären in alleiniger Verantwortung, dass das Produkt  
hereby declare in our sole responsibility, that the product  
déclarons, sous notre seule responsabilité, que le produit

Feldgerätekoppler  
Field device coupler  
Coupleur d'appareil de terrain

mit der EG-Baumusterprüfbescheinigung:  
under EC-Type Examination Certificate:  
avec Attestation d'examen CE de type:

**BVS 06 ATEX E 004 X**  
(DEKRA EXAM GmbH  
Dinnendahlstraße 9, 44809 Bochum)

auf das sich diese Erklärung bezieht, mit den folgenden Normen oder normativen Dokumenten übereinstimmt  
which is the subject of this declaration, is in conformity with the following standards or normative documents  
auquel cette déclaration se rapporte, est conforme aux normes ou aux documents normatifs suivants

Bestimmungen der Richtlinie Terms of the directive Prescription de la directive	Nummer sowie Ausgabedatum der Norm Number and date of issue of the standard Numéro ainsi que date d'émission de la norme
94/9/EG: ATEX-Richtlinie 94/9/EC: ATEX Directive 94/9/CE: Directive ATEX	EN 60079-0: 2009 EN 60079-7: 2007 EN 60079-11: 2007 EN 60079-15: 2005 EN 60079-18: 2004 EN 60079-26: 2007 EN 60079-27: 2008 EN 61241-0: 2006 EN 61241-1: 2004 EN 61241-11: 2006
2004/108/EG: EMV-Richtlinie 2004/108/EC: EMC Directive 2004/108/CE: Directive CEM	EN 61326-1: 2006
Allgemeine Normen ohne Bezug auf eine Richtlinie General standards without reference to a directive Normes générales sans référence à une directive	EN 50178: 1997 EN 61010-1: 2001 + Corrigendum / Errata

Waldenburg, 16.07.2010

Ort und Datum  
Place and date  
Lieu et date

J.-P. Rückgauer  
Leiter Entwicklung und Technik  
Director Design and Technology  
Directeur Développement et Technique

Dr. S. Jung  
Leiter Qualitätsmanagement  
Director Quality Management Dept.  
Directeur Dép. Assurance de Qualité

F-4174-601 11/2009 STMZ

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